We claim:

1. A balloon having a flexible wall, an intermediate body, proximal and distal cones, proximal and distal ends adapted for being mounted to a catheter, and at least one circumferential groove formed of the balloon wall adjacent a transition between the intermediate body and a cone.

2. The balloon of claim 1, wherein the at least one circumferential groove has a shape, in longitudinal cross-section, selected from C-shapes, U-shapes, W-shapes, open-sided polygons, and combinations thereof.

3. The balloon of claim 1, wherein the at least one circumferential groove is formed in at least one of the proximal and distal cones such that balloon diameters measured distal and proximal to the at least one circumferential groove are unequal.

4. The balloon of claim 1, wherein the at least one circumferential groove is at least partially filled with a flexible material that is adhered to the balloon.

5. The balloon of claim 4, wherein the flexible material comprises a foamed material.

6. A catheter comprising:

an elongate shaft having a lumen there through; and

a balloon mounted about a distal region of the shaft and being in fluid communication with the lumen, the balloon having a flexible wall, an intermediate body, proximal and distal cones, proximal and distal ends attached to the shaft, proximal and distal transitions between the intermediate body and the proximal and distal cones, respectively, and a distal circumferential groove formed of the balloon wall adjacent the distal transition.

7. The catheter of claim 6 further comprising a proximal circumferential groove formed of the balloon wall adjacent the proximal transition.

8. The catheter of claim 7, wherein the balloon is capable of being deflated around the shaft such that the proximal and distal cones each have deflated profiles that are larger than a deflated profile of the intermediate body.

9. The catheter of claim 8, wherein, during balloon deflation, the proximal and distal circumferential grooves form proximal and distal steps in diameter, respectively, between the deflated profile of the intermediate body and the deflated profiles of the proximal and distal cones.

10. A stent delivery catheter comprising:

an elongate shaft having a lumen there through;

a balloon mounted about a distal region of the shaft and being in fluid communication with the lumen, the balloon having a flexible wall, an intermediate body, proximal and distal cones, proximal and distal ends attached to the shaft, and a first circumferential groove formed of the balloon wall adjacent a transition between the intermediate body and one of the proximal and distal cones; and

a balloon-expandable stent mounted about the intermediate body of the balloon.

11. The stent delivery catheter of claim 10 further comprising a second circumferential groove formed of the balloon wall adjacent a transition between the intermediate body and the other of the proximal and distal cones

12. The stent delivery catheter of claim 10, wherein the first circumferential groove is at least partially filled with a flexible material that is adhered to the balloon.

13. The stent delivery catheter of claim 12, wherein, when the balloon is deflated, the flexible material forms a first dam to help retain the stent on the balloon.

14. The stent delivery catheter of claim 11, wherein, when the balloon is deflated, the proximal and distal cones each have deflated profiles that are larger than a deflated profile of the intermediate body such that the proximal and distal cones form proximal and distal dams, respectively, to help retain the stent on the deflated balloon.

15. A method of making a stent delivery catheter comprising:

providing a catheter having an elongate shaft with a lumen there through;

mounting a balloon about a distal region of the shaft and in fluid communication with the lumen, the balloon having a flexible wall, an intermediate body, proximal and distal cones, proximal and distal ends attached to the catheter shaft, and at least one circumferential groove formed of the balloon wall adjacent a transition between the intermediate body and one of the proximal and distal cones;

collapsing the balloon around the catheter shaft;

mounting a balloon expandable stent in a radially compressed configuration around the intermediate body of the balloon.

16. The method of claim 15, wherein mounting the stent further comprises holding the stent in the radially compressed configuration while inflating the proximal and distal cones to create dams that help retain the stent on the balloon.

17. The method of claim 16 further comprising:

heat setting the balloon to produce a shape memory therein of the dams formed in the proximal and distal cones.

18. The method of claim 15 further comprising:

at least partially filling the at least one circumferential groove with a flexible material that is adhered to the balloon.